

Two New Genera of Nitidulidae from the Oriental Region, with Notes on Phylogeny of the “Axyroid-Group” (Coleoptera, Nitidulidae, Nitidulinae)

Paolo AUDISIO* and Josef JELINEK**

* Dipartimento di Biologia Animale e dell'Uomo (Zoologia), viale dell'Università 32, 00185 Rome, Italy.

** Department of Entomology, National Museum, Praha 4, Kunratice 1, Czechoslovakia.

Two New Genera of Nitidulidae from the Oriental Region, with Notes on Phylogeny of the “Axyroid-Group” (Coleoptera, Nitidulidae, Nitidulinae) - Two new oriental genera of Nitidulidae, related to *Axyra* Er., are described: *Taraphia* gen. n. (including *Taraphia amplicollis* sp. n. from Borneo and Sumatra (type species) and *T. gemina* sp. n. from Sumatra) and *Megaucheniodes* gen. n. (including *Megaucheniodes corniger* sp. n. from Borneo). The “Axyroid-group” of genera (*Megauchenia* Mcl., *Axyra* Er., *Megaucheniodes* gen. n., *Pseudoplatychora* Grouv. and *Taraphia* gen. n.) is defined, polarity of some character states is discussed, and a generic level cladogram is proposed.

Key-words: Coleoptera - Nitidulidae - Oriental region - New genera - Phylogeny.

INTRODUCTION

The recent discovery of three undescribed species from Borneo and Sumatra, belonging to two new genera in the subfamily Nitidulinae, prompted us to describe these taxa and investigate the relationships of the “Axyroid-group”, to which both new genera undoubtedly are to be referred. This group was recently studied by JELINEK (1982), but discovery of new taxa provides new information on the systematics of the group.

Material for this study was borrowed from or deposited in the following Museums and private collections: Muséum d'Histoire Naturelle, Geneva (MHNG); Muséum National d'Histoire Naturelle, Paris (MHNP); Narodni Muzeum, Praha

(NMP); P. Audisio Collection, Rome (CAR); Musée Royal de l'Afrique Centrale, Tervuren (MRAC).

Taraphia gen. n.

Gender: feminine.

Type species: *Taraphia amplicollis* sp. n. (= *Atarphia amplicollis* Grouvelle, inedit.)

5.1-7.5 mm in length, oblong oval convex beetles with hearth-shaped pronotum distinctly wider than elytra (fig. 1).

Tegument heavily sclerotized, blackish, with large and deep pit-shaped and irregularly dispersed punctures, elytra at least partly covered with conspicuous raised granules. Pubescence reduced, particular rudimentary punctures hardly visible, recumbent, situated at the bottom of pits and hardly exceeding (reaching over) the perimeter of corresponding punctures. Surface of elytra with sparse stout erect thick setae (fig. 1) hardly arranged in irregular longitudinal lines; similar but shorter setae occur on outer margins of pronotum, posterior margins of abdominal sterna, on legs, etc. Outer margins of pronotum with very short and dense hairs only.

Head slightly narrowed behind eyes (collum broad), with converging temples. Eyes rather coarsely faceted, without distinct ocellar setae, their inner dorsal margins bordered by deep subparallel furrows (fig. 1). Antennae 11-segmented with broadly oval 3-segmented club, slightly longer than wide; segment I rather narrow, arcuate, twice as long as wide, with conspicuously pubescent anterior surface, segment III long and slender, segment VII and VIII transverse, the latter only slightly wider than preceding ones (figs. 1, 16).

Labrum transverse, with two broad semicircular lobes separated by a narrow deep V-shaped incision, at the bottom of it with erect fascicle of hairs (fig. 1). Mandibles arcuate with simple or bifid tips (fig. 1). Maxillary palpi 4-segmented, terminal segment elongate, subcylindrical, by nearly one fourth longer than wide, narrowly truncate at the apex. Mentum transverse, its anterior angles obtusely rounded, labial palpi 3-segmented, terminal segment somewhat conical, wider than long, rather broadly truncate at the apex.

Lateral margins of postmentum broadly arcuate, moderately converging posteriorly, antennal furrows subparallel to moderately converging posteriorly, laterally extended into concavity occupying the space behind eyes (fig. 26).

Pronotum transverse, wider than elytra, cordiform, strongly narrowed both anteriorly and posteriorly (figs. 1, 4); anterior margin not bordered, truncate, anterior angles subrectangular, strongly prominent. Sides strongly arcuate and broadly explanate, more or less concave in front of posterior angles, those obtuse, not prominent. Basal margin bordered, somewhat expanded over the base of scutellum in the middle, oblique and very shallowly emarginated laterally. Scutellum small, triangular, prescutoscutellar suture indistinct, replaced by a very fine raised transverse edge. Elytra oblong oval, convex, with hardly explanate and distinctly crenulate sides,

simultaneously rounded at the apex, entirely concealing pygidium (figs. 1, 4). Abdominal tergum VIII in males not exposed, hidden by pygidium.

Prosternum transverse, its median part bordered laterally by a pair of blunt raised edges moderately converging posteriorly, at their outer side with an oval deep opening (fig. 3). Prosternal process very broad, flat, broadly V-shaped at the apex, without vertical apical wall, lightly depressed between procoxae (figs. 3, 12). Procoxal cavities closed. Mesosternum transversely convex, hardly longitudinally carinate in the middle, its anterior margin extremely narrowly bordered. Posterior margin of mesosternum more or less raised; meso-metasternal suture little distinct, but it seems to be very fine, V-shaped, its tip rolled over to end in the deep lunular intercoxal cavity (see below). Metasternum transverse. Caudal marginal lines of mesocoxal cavities arcuate, closely following posterior margins of mesocoxal cavities and ending in anterior corners of metasternum, their inner ends between mesocoxae connected by a transverse lunular and very deep groove (Fig. 3). Metacoxae very widely separated, posterior margin of metasternum between them truncate. Caudal marginal lines of metacoxal cavities arcuate, closely following posterior margins of metacoxal cavities, at inner corner of metatibia ending in a small deep groove, which may not always be equally pronounced and seems to be enlarged and adapted original punctures (fig. 3). Hypopygidium impunctate, with typical longitudinal impressions.

Legs rather long, anterior femora longitudinally oval, with anterior face flattened for receiving anterior tibiae. Posterior and intermediate femora very long, about 3.3 and 4 times as long as wide respectively, parallel-sided, posterior margin arcuately emarginated at distal end. Anterior margin of anterior tibia oblique, outer apical angle rounded. Meso- and metatibiae polygonal in cross-section, with several longitudinal edges bearing short and close setae and with rather short terminal spurs (fig. 1). Tarsi 5-segmented, narrow, compressed laterally. Tarsal claws simple.

Male genitalia with tegmen heavily sclerotized, with deep U-shaped median incisure (figs. 17, 19); aedeagus less sclerotized, with not well defined anterior apex (figs. 18, 20); internal sac with a long arial filament and a compact complex well sclerotized structure at the distal end (figs. 23, 24). Ovipositor of normal nitiduloid type, with long narrow contiguous gonostyloids and distinct styli in apical position (figs. 14, 15).

C o m m e n t s .

As indicated by a label attached to one of the examined specimens of *Taraphia amplicollis* sp. n. (MHNP), the type species was attributed to the genus *Atarphia* Reitter by Grouvelle (ms name). The general body form, broad and flat prosternal process, mesosternal form, widely separated metacoxae and simple tarsi resemble conditions present in the genera *Atarphia* Reitter and *Pseudoplatychora* Grouvelle.

The new genus differs from *Atarphia* by the granular structure of elytra, the form of the prosternum (with distinct raised edges bordering its median portion), and presence of peculiar cavities on prosternum, metasternum and first abdominal sternum. The two latter characters are shared by the sympatric genus *Pseudoplatychora* Grouvelle. The two genera may be separated as follow:

Taraphia

Pronotum cordiform, more or less emarginated before posterior angles.
Sides of pronotum broadly explanate, disc uneven

Prescutoscutellar suture apparently obliterated, replaced by a fine transverse edge.

Surface of elytra with raised granules.

Pygidium completely concealed by elytra, less sclerotized and pigmented, rusty.

Caudal marginal lines of mesocoxal cavities arcuate, ending in anterior corners of metasternum, closely following posterior margins of mesocoxal cavities.

Caudal marginal lines of metacoxal cavities simply arcuate, closely following posterior margins of metacoxal cavities.

Hypopygidium laevigate with characteristic structures.

Abdominal sterna 2-4 smooth, except for one transverse series of punctures at the base.

Pseudoplatychora

Pronotum gradually narrowed both anteriorly and posteriorly, sides not emarginated.

Sides of pronotum less conspicuously explanate, disc (apart from transverse prescutellar impression) moderately convex, without pronounced relief.

Prescutoscutellar suture distinct but interrupted in the middle.

Elytra punctate, without raised granules.

Pygidium partly exposed, normally sclerotized and pigmented, blackish.

Caudal marginal lines of mesocoxal cavities divided, inner parts running laterocaudad, outer additional part accompanying posterior margin of mesocoxal cavities.

Caudal marginal lines of metacoxal cavities angulate and interrupted.

Hypopygidium normal, punctate.

Abdominal sterna 2-4 with normal irregular punctures.

D i s t r i b u t i o n : Sumatra and Borneo.

B i o n o m i c s : unknown, the form of body suggests either saprophagous or mycophagous way of life. Peculiar grooves on pro-, and metasternum as well as on the first abdominal sternum may be interpreted as mycangia, facilitating the transfer of fungal spores. However, presence of microscopic hairs at the bottom of the prosternal grooves suggest they may function as chemoreceptor organs.

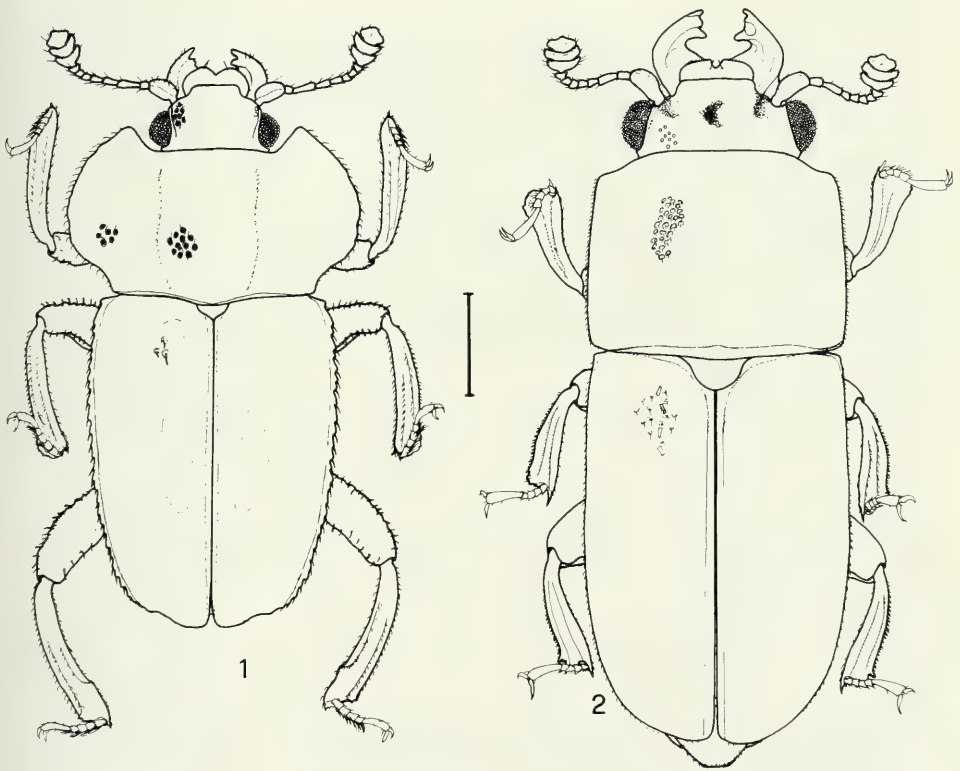
E t y m o l o g y : anagram of the generic name *Atarphia* Reitt.

KEY TO SPECIES OF *Taraphia*.

- 1 (2) Median part of pronotum fluently and strongly transversely vaulted, without median impression; sides of pronotum strongly regularly arcuate, feebly concave only at posterior angles, broadly explanate all along their length (fig. 1). Outer edge of pronotum fringed with longer sparse erect setae separated by their length (fig. 1). Suture smooth and shining, impunctate in two posterior thirds. Punctures of metasternum equal in size to those of the first abdominal sternum; punctures of sterna 2-4 smaller, not reaching midlength of sterna. Disc of hypopygidium arcuately bordered at the apex, with simple transverse series of punctures at the base, otherwise glabrous except for a few minor punctures at sides (fig. 5). Outer margin of elytra deeply incised at the apex

(fig. 1). Male and female genitalia as figured (figs. 14, 17, 18, 24). Length 5.7-7.0 mm. Sumatra, Borneo *T. amplicollis* sp. n.

- 2 (1) Broadly convex disc of pronotum divided by median longitudinal impression (fig. 4); sides of pronotum somewhat irregularly arcuate, with deep obtusangulate sinuosity occupying the whole width of the explanate border in posterior third. Lateral edge of pronotum fringed with somewhat shorter and distinctly closer setae separated by less than their length. Suture in two posterior thirds with series of fine but distinct punctures. Punctures of metasternum larger than those of the first sternum, punctures of sterna 2-4 large, their diameter fairly equal to midlength of sterna. Apical margin of the disc of hypopygidium twice obtusangulate, with 5 parallel longitudinal furrows (fig. 6). Outer margin of elytra at the apex abruptly curved, not excised (figs. 4, 6). Male and female genitalia as figured (figs. 15, 19, 20, 23). Length 5.1-7.5 mm. Sumatra *T. gemina* sp. n.



FIGS 1-2.

Habitus of *Taraphia amplicollis* n. gen., n. sp., male paratype from Borneo (1) and of *Megaucheniodes corniger* n. gen., n. sp., male holotype from Borneo (2). Scale bar = 1.15 mm.

***Taraphia amplicollis* sp. n.**

Type material: holotype, ♂: Borneo, Sabah Mountains, Kinabalu Nat. Park, Poring Hot Springs, 495 m, 25.VIII.1988, A. Smetana leg., deposited in the MHNG. Paratypes: 3 ♂♂, same data as holotype, above Poring Hot Springs, 520 m, 15.VIII.1988, A. Smetana leg. (MHNG, CAR and NMP); 1 ♂, 2 ♀♀, ibidem, 22.VIII.1988, A. Smetana leg. (MHNG); 2 ♀♀, ibidem, 500 m, 8.V.1987, D. Burckhardt & I. Löbl leg. (MHNG); 1 ♂, dtto, 6.V.1987 (MHNG); 1 ♀, dtto, 9.V.1987 (MHNG); 1 ♂, dtto, 13.V.1987 (MHNG); 1 ♀, ibidem, 510 m, 30.VIII.1988, A. Smetana leg. (MHNG); 2 ♂♂, 1 ♀, same data as holotype, Kipurgit Crk. 2, 490 m, 14.VIII.1988, A. Smetana leg. (MHNG, CAR); 1 ♀, dtto, 15.VIII.1988, (MHNG); 1 ♀, same data as holotype, Eastern Ridge Tr., 790 m, 17.VIII.1988, A. Smetana leg. (MHNG); 1 ♂, ibidem, 850 m, 28.VIII.1988, A. Smetana leg. (MHNG); 1 ♂, same data as holotype, near Bat Cave, 600 m, 10.V.1987, D. Burckhardt & I. Löbl leg. (MHNG); 1 ♂, Borneo, labelled "Kinabalu" and "*Atarphia amplicollis* Grouv., type" (inedit.) (MHNP); 3 ♂♂, Sumatra, Aceh, Mt. Leuser N.P., 300-500 m, Ketambe, 23-30.XI.1989, I. Löbl, D. Agosti & D. Burckhardt leg. (MHNG, CAR); 1 ♂, 1 ♀, Sumatra, labelled "Sumatra's O.K., + 600 m, 2 de Sem. 89 (i.e. 1889), I.Z. Kannegieter" (MHNP).

MALE

Anterior margin of clypeus not bordered, extremely shallowly arcuately emarginated. Frons between eyes with two large shallow impressions, anterior margin of frons slightly raised above insertions of antennae. Temples more or less straight, strongly converging posteriorly. Punctures of frons much larger than eye facets, deep, pit-shaped, becoming gradually smaller towards clypeus.

Antennae: segment I relatively narrow, arcuate, twice as long as wide, with densely pubescent anterior surface. Segment II hardly longer than wide, somewhat thicker than the following ones; III almost three times as long as wide, IV 1.8 times, V 1.5 times longer than wide, VI as long as wide, VII and VIII transverse, the latter only slightly wider than the preceding one; antennal club broadly oval, 1.2 times longer than wide (fig. 1).

Pronotum transversely cordiform, wider than elytra, widest at about one third of its length and there 1.78-1.90 times wider than long, strongly narrowed both anteriorly and posteriorly (fig. 1). Posterior angles 1.19-1.22 times more apart than anterior ones. Anterior margin truncate, not bordered, anterior angles subrectangular, strongly prominent. Sides broadly explanate, strongly regularly arcuate, shortly concave at obtuse posterior angles. Lateral edge fringed with rather long and sparse erect setae separated by their length or slightly more (fig. 1). Basal margin bordered, broadly and flatly arcuate in the middle, oblique and very shallowly arcuately emarginated laterally. Median portion of pronotal disc, delimited laterally by a pair of longitudinal depressions in basal half strongly, craniad gradually more flatly transversely vaulted, in basal half sometimes with a faintly marked median longitudinal carinula, bearing large deep punctures separated in the middle by mostly less than one diameter, by one diameter or more laterally; spaces between punctures smooth, shining, narrow, more or less honeycombed, on separately flatly vaulted lateral parts of the disc at about the level of inner margin of anterior angles, making longitudinal crenulate combs somewhat diverging posteriorly. Explanate lateral

borders in the middle nearly as wide as antennal club, gradually narrowed posteriorly but reaching posterior angles, rugose.

Scutellum triangular, smooth and shining.

Elytra 1.23-1.26 times longer than wide, oblong oval, widest at about one fourth of their length, more strongly narrowed posteriorly than anteriorly, simultaneously rounded at the apex and completely concealing pygidium (fig. 1). Humeral angles obtuse. Sides in anterior half more strongly, in posterior half broadly and flatly arcuate, not explanate, besides apex with rather deep angulate incisure. Suture in basal third not bordered, lightly roof-shaped, in two posterior thirds bordered, smooth and shining, impunctate. Surface of elytra both transversely and longitudinally rather strongly vaulted, at about one fourth of their length moderately transversely depressed, uneven, in basal half with conspicuous raised pointed granulae gradually diminishing posteriorly, distinct punctures apparent rather behind the midlength of elytra accompanying the diminished granules, in the apical third is the structure rather laevigated, without granules but with sparse punctures. All elytra with sparse erect thick yellowish setae.

Median portion of prosternum bordered laterally by raised blunt edges converging posteriorly, as well as prosternal process bearing large pit-shaped close punctures. Outer flat portion of hypomera shallowly and densely punctate, inner portion smooth and shining, broadly and deeply concave in front of outer angles of procoxae. Mesosternum transversely convex, very finely microreticulate, dull, with two groups of punctures in front of inner parts of mesocoxae. Metasternum in the middle broadly concave, deeply coarsely punctate, between punctures smooth and shining. Punctures of the first abdominal sternum equal in size to those of metasternum. Sterna 2-4 smooth and shining, each with single transverse series of punctures at basal margin; diameter of punctures not reaching midlength of sterna. Disc of hypopygidium obsoletely arcuately bordered apically, with transverse single series of deep punctures at the base, otherwise glabrous apart from a few very fine dispersed punctures at sides.

Black, erect setae on elytra, lateral margins of pronotum and posterior margins of abdominal sterna yellowish.

Length 5.7-7.0, width (of pronotum) 2.8-3.7 mm.

Male genitalia as figured (figs. 17, 18, 24); tegmen strongly sclerotized, of "Meligethoid" shape (i.e. somewhat strongly emarginate in the middle at the apex), rather unusual in members of the subfamily Nitidulinae.

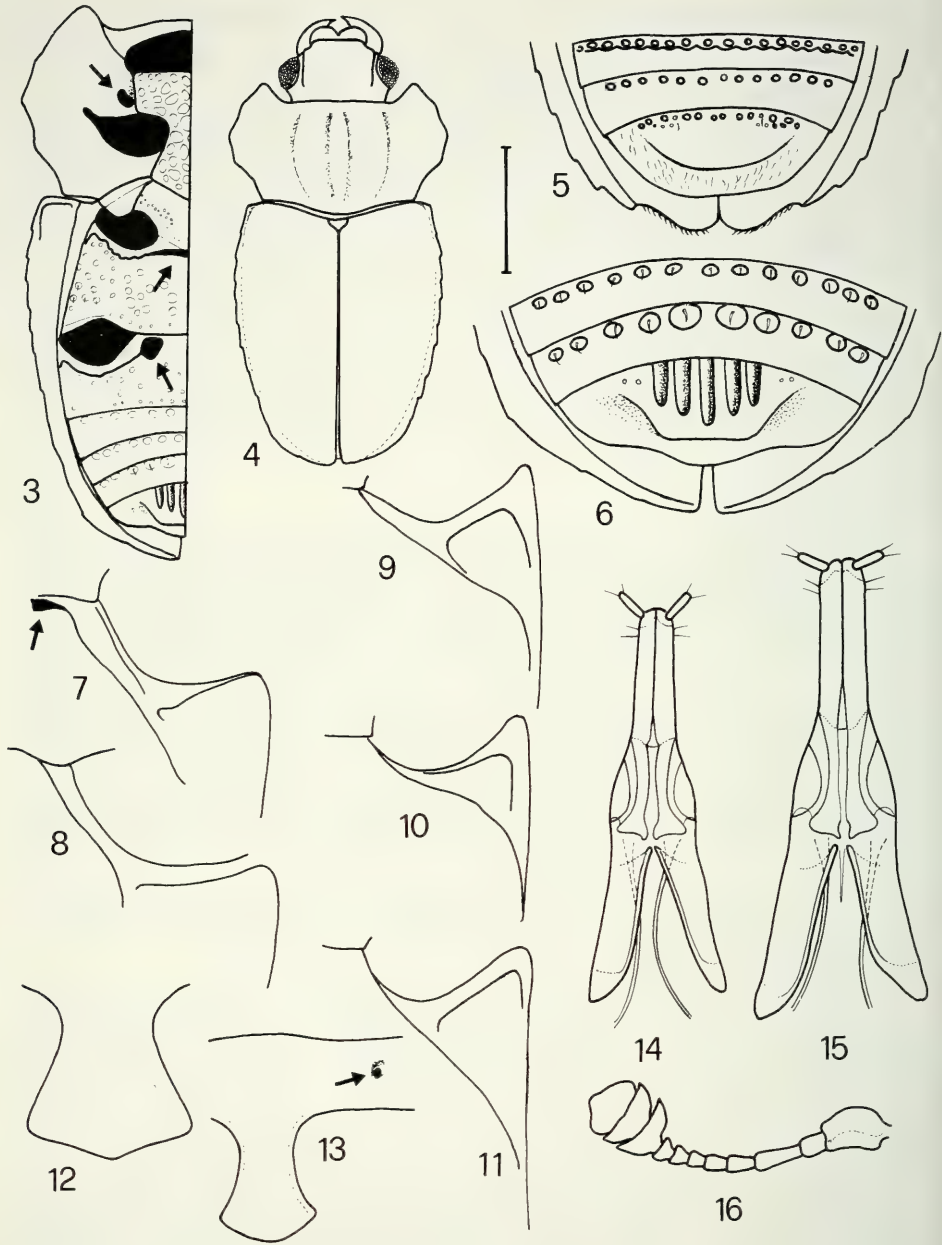
FEMALE

Similar to male, but metasternum in the middle more shallowly concave. Ovipositor as figured (fig. 14).

E t i m o l o g y : referring to the exceptional pronotal width of the new species.

Taraphia gemina sp. n.

T y p e m a t e r i a l : holotype, ♂, Sumatra, Aceh, Mt. Leuser N.P., 300-500 m, Ketambe, 23-30.XI.1989, I. Löbl, D. Agosti & D. Bruckhardt leg. (MHNG). Paratypes: 3 ♂♂.



FIGS 3-16.

3, ventral surface of prothorax and abdomen of *Taraphia gemina*, n. sp., female paratype from Sumatra (legs and head removed; arrows point at prosternal, metasternal and urosternal "mycangia"); 4, dorsal habitus of the same; 5, 6: last three abdominal sterna of *Taraphia ampli-*

8 ♀♀; 3 ♂♂, 7 ♀♀, same data as type (MHNG, CAR, NMP); 1 ♀, Sumatra, ("Bedagei int., Sumatra's O.K."), 600 m, 2. de Sem. 89 (i.e. 1889), I.Z. Kannegieter" (MHNP).

MALE.

Anterior margin of clypeus truncate, not bordered. Frons between eyes with two large shallow impressions, its anterior margin slightly raised above the insertions of antennae. Temples more or less straight, strongly converging posteriorly. Punctures of frons large, much larger than eye facets, very deep, pit-shaped, becoming gradually smaller towards clypeus. Dorsal inner margins of eyes bordered by deep subparallel longitudinal furrows (fig.4).

Antennae rather slender, segment I thicker, prolonged, arcuate, nearly twice as long as wide; II segment cylindrical, a little longer than wide, III almost three times longer than wide, IV 1.4 times, V 1.2 times longer than wide, VI as long as wide, VII and VIII transverse, the latter only slightly wider than the preceding ones. Antennal club broadly oval, only 1.1 times longer than wide (fig. 16).

Pronotum transverse, distinctly wider than elytra, widest at its midlength and 1.75-1.85 times wider than long, strongly narrowed both anteriorly and posteriorly (figs. 3, 4). Posterior angles only 1.04-1.07 times more apart than anterior ones. Middle portion of anterior margin truncate, not bordered, anterior angles subrectangular, strongly prominent, posterior ones broadly obtuse. Basal margin bordered, in the middle broadly arcuate, somewhat extended posteriorly over the base of scutellum, broadly and shallowly arcuately emarginated laterally. Sides in anterior half somewhat irregularly arcuate, broadly explanate; the explanate border in anterior half as wide as four fifths of the width of antennal club. Sides in poster half broadly emarginate, the emargination occupying the whole breadth of the explanate border, with prominent obtusangulate sinuosity behind the midlength of pronotum. Median part of pronotum (nearly as wide as collum) transversely vaulted, divided by a broad and deep median longitudinal impression and laterally bordered by longitudinal impression separating it from the flatly separately vaulted lateral parts of the pronotal

collis n. sp., male paratype from Borneo (5) and of *Taraphia gemina* n. sp., female paratype from Sumatra (6); 7, 9, 10, 11: left mesocoxal caudal marginal line of *Megaucheniodes corniger* n. sp., male holotype from Borneo (7; arrow points at metasternal "mycangium"), of *Axyra tibialis* Grouv. from Congo (9), of *Platychora ebena* (J. Thoms.) from Sierra Leone (10) and of *Megauchenia setipennis* McL. from Sumatra (11); 8, left metacoxal caudal marginal line of *Megaucheniodes corniger* n. sp., male holotype from Borneo; 12, prosternal process of *Taraphia amplicollis* n. sp., male paratype from Borneo; 13, prosternal process with lateral portion of prosternum of *Megaucheniodes corniger* n. sp., male holotype from Borneo (arrow points at "mycangium"); 14, 15: ovipositors of *Taraphia amplicollis* n. sp., female paratype from Borneo (14) and of *Taraphia gemina* n. sp., female paratype from Sumatra (15); 16, left antenna of *Taraphia gemina* n. sp., female paratype from Sumatra. Scale bar = 0.32 mm (figs. 14, 15); = 0.62 mm (figs. 7-13); = 0.70 mm (figs. 6, 16); = 0.85 mm (fig. 5); = 1.24 mm (fig. 3); = 1.75 mm (fig. 4).

disc. Punctures large, pit-shaped, irregular, separated mostly by less than one diameter. Space between them smooth, shining, often more or less raised up to resembling honeycomb, on lateral parts of the disc partly confluent to form raised longitudinal combs (uneven edges). Explanate lateral borders rugose.

Scutellum small, transversely triangular (fig. 4), glabrous, impunctate, shining.

Elytra widest behind humera, at about one fourth of their length, narrower than pronotum, oblong oval, more strongly narrowed posteriorly than anteriorly, simultaneously rounded at the apex and completely concealing pygidium (figs. 4, 6). Humeral angles obtuse. Sides in anterior half more strongly, in posterior one very flatly arcuate, hardly explanate. Suture bordered in two posterior thirds and there smooth, shining, with series of fine punctures, in anterior third not bordered, somewhat roof-shaped. Surface of elytra both longitudinally and transversely rather strongly vaulted, at about one fourth of their length lightly transversely impressed, separately bulged besides scutellum, the bulges separated from the humeral ones by short and moderate longitudinal impressions. Punctures irregular, large, pit-shaped, in anterior half of elytra accompanied by raised rasp-like granulae situated at their anterior margin.

Pronotum and elytra with sparse long and stout erect yellowish-brown setae inserted in microscopic pores situated either at posterior margin of raised granulae on elytra, or at anterior margin of punctures. Elytral punctures themselves somewhat smaller than those of pronotum, but situated at the bottom of large and deep pits. Otherwise recumbent hair of elytra strongly reduced to rudiments hardly reaching over outline of the pit and hardly distinct at all.

Coarse punctures of mentum transversely confluent, spaces between them very narrow, raised and smooth, making transverse shining veins. Large, pit-shaped punctures of postmentum very close. Median part of prosternum bordered laterally by blunt raised edges converging posteriorly, like prosternal process punctate with large and close pit-shaped punctures. Outer flat portion of hypomera with shallow punctures nearly equal in size to eye facets and separated by less than one diameter, inner portion smooth and shining, in front of outer corners of procoxae broadly and deeply concave. Mesosternum transversely convex, only at posterior margin coarsely punctate, otherwise smooth, extremely finely microreticulate, dull. Posterior margin between meso- and metacoxae raised to a transverse sharp carina delimiting the transverse lunular groove on the intercoxal process of metasternum. Metasternum transverse, in the space between meso- and metacoxae broadly and deeply concave, bearing large pit-shaped punctures between them smooth and shining. Punctures of the first abdominal sternum smaller and sparser than those of metasternum, a little larger than eye facets and separated by one diameter or more. Sterna 2-4 each with only one transverse series of large deep punctures equal in size to, or larger than those of metasternum. Disc of hypopygidium somewhat raised, with a blunt, twice obtusangulate obsolete apical margin, smooth and strongly shining, bearing five deep and rather broad parallel furrows (grooves) (fig. 6). The entire ventral surface smooth and shining, rudimentary hairs hidden within particular punctures, stout setae yellowish, obliquely outstanding, arranged in series at posterior margin of each sternum.

Black, partly depigmented and desclerotized, completely hidden pygidium usually rusty. Erect setae pale, yellowish.

Length 5.1-7.5 mm, width (of pronotum) 2.6-3.5 mm.

Male genitalia as figured (figs. 19, 20, 23), generally similar to those of the preceding species, aedeagus with dark pigmented border at the base, endophallus apart from structures described above with a long blunt single thorn at the base.

FEMALE

Similar to male, but metasternum more shallowly concave. Median longitudinal impression of pronotum shallower than in male, elytra rather regularly convex, hardly impressed behind scutellum. Ovipositor as figured (fig. 15).

C o m m e n t s : very similar to its congener, *T. amplicollis* sp. n., from which it differs by characters given in the above key. Owing to peculiar shape of pronotum, is confusion with members of other known genera of Nitidulidae hardly possible.

E t y m o l o g y : from *gemina* (latin, feminine: twin), referring to its similarity to its congener.

Megaucheniodes gen. n.

G e n d e r : masculine.

T y p e s p e c i e s : *Megaucheniodes corniger* sp. n.

Middle sized (8 mm), heavily sclerotized, elongate, parallel-sided and transversely convex beetles (fig. 2).

Head very large, moderately narrowed behind eyes (collum broad), with converging temples. Eyes rather coarsely faceted, their inner margins slightly bordered. Antennae 11-segmented with subcircular 3-segmented club, nearly as long as wide, somewhat densely pubescent; segment III nearly as long as segment IV and V together, segment VII and VIII transverse, cup shaped, the latter slightly wider than preceding ones (fig. 2).

Labrum transverse, with two almost truncate and broad lobes separated by narrow U-shaped incision, at the bottom of it with erect fascicle of hairs (fig. 2). Mandibles large, arcuate, with double and asymmetrical tips (fig. 2). Maxillary palpi 4-segmented, terminal segment elongate, subconical, nearly two times longer than wide, narrowly truncate at the apex. Mentum transverse, its anterior angles squared; labial palpi 3-segmented, terminal segment somewhat conical, longer than wide, truncate at the apex.

Lateral margins of postmentum broadly arcuate, converging posteriorly, antennal furrows well defined, somewhat moderately and arcuately converging posteriorly (fig. 27).

Pronotum transverse, as wide as elytra, subrectangular, parallel-sided (fig. 2); anterior margin not bordered, basal margin bordered, truncate, hardly expanded over

the base of scutellum in the middle. Scutellum middle sized, semicircular, prescutoscutellar suture hardly distinct. Elytra oblong, parallel-sided, not explanate and not crenulate at sides, simultaneously rounded at the apex, concealing the three fourths of pygidium (fig. 2). Abdominal tergum VIII in males not exposed.

Prosternum transverse, without raised edges, but with a couple of small foveae may be interpretable as "mycangia" (fig. 13). Prosternal process somewhat broad, flat, broadly V-shaped at the apex (fig. 13), without vertical apical wall, not depressed between procoxae. Procoxal cavities closed. Mesosternum transversely convex, hardly longitudinally carinulate in the middle, its anterior margin somewhat narrowly bordered. Posterior margin of mesosternum not raised between mesocoxae. Metasternum transverse. Caudal marginal lines of mesocoxal cavities strongly running backwards to form an open triangle, in the middle connected to form a transverse and deep groove (fig. 7). Caudal marginal lines of metacoxal cavities strongly running backwards to form an open triangle (fig. 8), without foveae nor grooves. Hypopygidium normal, finely punctate.

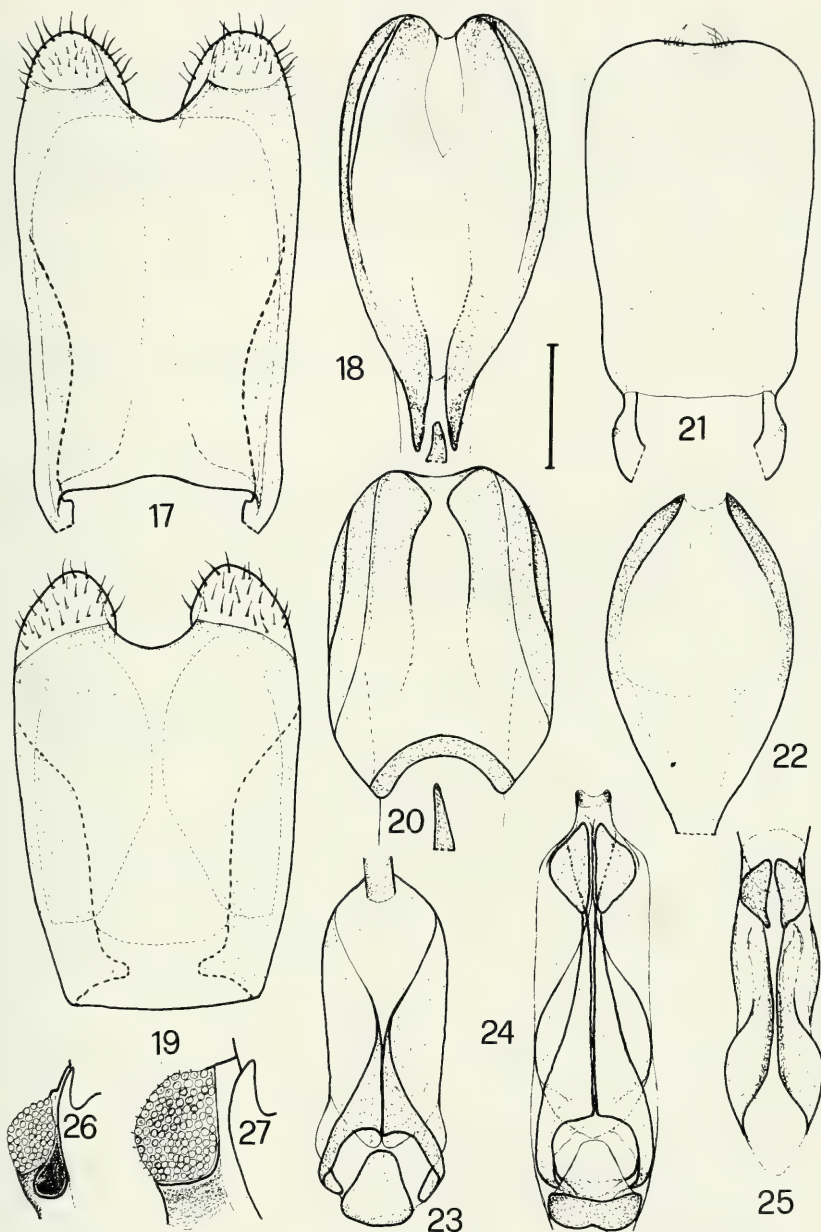
Tegument heavily sclerotized, dark brown to blackish, with irregular, coarse, large and shallow punctures on head and pronotum; elytra covered with more irregular and conspicuous raised granules, without longitudinal series of punctures. Pubescence reduced, hardly exceeding the perimeter of corresponding punctures, but surface of elytra with sparse, large, erect and squamulate setae hardly arranged in irregular longitudinal series (fig. 2); similar setae occur on discal part of pronotum. Outer margins of pronotum with very short and dense hairs only.

Legs rather long, robust, femora longitudinally oval and somewhat transversely convex, nearly 2.5 times as long as wide. Meso- and metatibiae polygonal in cross-section, with several longitudinal edges bearing short and close setae and with rather short terminal spurs (fig. 2). Tarsi 5-segmented, narrow, compressed laterally. Tarsal claws simple.

Male genitalia with tegmen heavily sclerotized, of normal nitiduloid type, its apex not emarginate in the middle (fig. 21); aedeagus less sclerotized, with not well defined anterior apex (fig. 22); internal sac somewhat complicate and with heavily sclerotized pieces.

Ovipositor unknown.

C o m m e n t s : the new genus belongs to the group of genera of the subfamily Nitidulinae rather closely related to *Axyra* Er. and *Megauchenia* McLeay, here defined as the "Axyroid-group". In spite of the similarities with some members of the sympatric genus *Megauchenia*, *Megaucheniodes* seems to be in fact more closely related to both *Pseudoplatychora* Grouv. and *Taraphia* gen. n., as well as to the mainly afro-tropical genus *Axyra* Er. *Megaucheniodes* differs from *Pseudoplatychora* Grouv. and *Taraphia* gen. n. by its more cylindrical body form, by tuberculate frons and by the open metasternal axillary space. It is easily distinguished from *Megauchenia* by the lack of serial elytral punctures, by the mesocoxal caudal marginal lines connected in the middle, and by the third antennal segment shorter (slightly longer than fourth and fifth segment together).



FIGS. 17-27.

Tegmen, aedeagus and internal sac of *Taraphia amplicollis* n. sp., male paratype from Borneo (17, 18, 24), of *Taraphia gemina* n. sp., male paratype from Sumatra (18, 20, 23) and of *Megaucheniodes corniger* n. sp., male holotype from Borneo (21, 22, 25); 26, 27: right ocular area (ventral view) of *Taraphia amplicollis* n. sp., male paratype from Borneo (26) and of *Megaucheniodes corniger* n. sp., male holotype from Borneo (27). Scale bar = 0.24 mm (figs. 17-25); = 0.62 mm (figs. 26-27).

Distribution: Borneo.

Bionomics: unknown; the form of body suggests a mycophagous way of life, living under bark or in xylophagous beetle tunnels.

Etymology: Derived to emphasize the close similarities with the sympatric genus *Megauchenia* McLeay.

***Megaucheniodes corniger* sp. n.**

Type material: Holotype ♂: Borneo, Sabah Mountains, Kinabalu Nat. Park, Poring Hot Springs, 485 m, 14-31.VIII.1988, A. Smetana leg. (MHNG).

MALE

Anterior margin of clypeus not bordered, truncate (fig. 2). Frons between eyes without impressions, but strongly raised above insertion of antennae and in the middle, to form a large and isolated conical tubercle (fig. 2). Temples relatively straight, strongly converging posteriorly. Punctures of frons nearly 1.5 times as large as eye facets, pit-shaped, somewhat deep, becoming gradually smaller towards clypeus and lateral margins.

Antennae (fig. 2): segment I relatively narrow, arcuate, nearly twice as long as wide, with densely pubescent anterior surface. Segment II nearly 1.2 times as long as wide; segment III almost 2.5 times as long as wide, IV and V hardly longer than wide, VI, VII and VIII transverse, the latter only slightly wider than the preceding ones. Antennal club broad, subcircular, feebly convex.

Pronotum rectangular (fig. 2), parallel-sided, almost 1.25 times wider than long, with almost straight posterior angles and broadly obtuse anterior angles; anterior margin not bordered, almost truncate in the middle. Basal margin bordered, very broadly arcuate in the middle. Lateral margins fringed with short and dense setae separated by half their length or less. Pronotum somewhat regularly transversely vaulted, with a faintly marked and scarcely defined median longitudinal carinula, without explanate lateral borders. Punctures large and circular, 2-3 times as large as eye facets, shallow, larger in discal area, becoming smaller cranially and laterally, with very fine and hardly distinct golden hairs and sparse, large, erected and squamule-like setae; spaces between punctures smooth and shining, very narrow.

Scutellum semicircular, shining (fig. 2).

Elytra (fig. 2) nearly 1.45 times longer than their combined width, oblong, parallel-sided, uniformly transversely vaulted, not completely concealing pygidium. Humeral angles obtuse. Suture in basal third not bordered, in two posterior thirds bordered. Punctures of elytra with feebly raised granulae, not seriate. All elytra with sparse erect yellowish squamulate setae (fig. 2).

Pygidium partly exposed, rounded at apex.

Metasternum in the middle nearly simple, without impression, except for a shallow and small subcircular area in front of its posterior margin; punctures relatively fine and sparse, space between punctures large, smooth and shining.

Abdominal sterna simple, without sexual characters, sparsely punctured.

Blackish-brown, hairs and erect setae on elytra yellowish.

Length 8.0 mm, width (of elytra) 3.0 mm.

Male genitalia as figured (figs. 21, 22, 25); tegmen of normal nitiduloid shape, not emarginate in the middle at the apex.

E t y m o l o g y : refers to the strong tubercle present on the frons between eyes (in males specimens only ?).

DISCUSSION

Judging from manuscript label accompanying one of examined specimens of *Taraphia amplicollis* gen. n. sp. n., Grouvelle attributed this (by him inedited) species to the genus *Atarphia* Reitter. The two genera have some features in common, indeed, but it seems that the phenotype of the two genera is close to the generalized ancestral body form of Nitidulidae. Broadly oval and relatively convex body with more or less fringed lateral margins, widely separated coxa (especially metacoxae), prominent anterior angles of pronotum, broad and flat prosternal process without vertical apical wall, mesosternum situated a little lower (more dorsad) than metasternum and slightly (if at all) carinate in the middle, non abbreviated elytra reaching their maximum length at suture, irregular puncturation and recumbent pubescence intermixed with rather irregular rows of sparse and long outstanding setae (perhaps with sensorial function?) and narrow tarsi appear to be plesiomorphies occurring in various "relatively plesiotypic" genera of various nitidulid subfamilies (like *Amphicrossus* Er., *Epuraeanelle* Reitt. and *Africare* Kir. (Carpophilinae), *Cryptarcha* (Cryptarchinae), *Omosita* Er., *Atarphia* Reitt., *Physoronia* Reitt., *Pocadites* Reitt., *Lordyodes* Reitt., *Pseudoplatychora* Grouv., etc. (Nitidulinae) and may be uninformative for reconstructing phylogenetic relationships within the family. These characteristics occur in many saprophagous and mycophagous nitidulid genera, and some of these features may have an adaptative significance. For example, erect hairs and deep sculpturing of the surface seem to facilitate adhesion of substrates (i.e., fermenting saps, fungal spores, etc.), thus masking the beetles among their environment. Also longitudinal costae on the elytra are likely to increase rigidity of the body for Coleoptera living under bark or stones. However, our current knowledge of the systematics of Nitidulinae is unsatisfactory and the monophyly of some genera, e.g. *Atarphia* Reitt. and *Physoronia* Reitt., seem dubious, perhaps due to convergent characters.

In light of the poor knowledge of the systematics of the Nitidulids we are confident that the "Axyroid-group" can be defined based upon the following synapomorphies occurring nowhere else in the family: pronotosternal suture with mycangia-like structures and basal portion of metacoxal axillary lines with a deep furrow or cavities. JELINEK (1982) proposed relationships among the genera *Platychora* Er., *Prometopia* Er., *Parametopia* Reitter, *Axyra* Er., *Pseudoplatychora*

TABLE 1

Assumed character state polarity in members of the "Axyroid-group" of genera.
P = plesiomorphic state; A = apomorphic state. See text for explanation.

N s	CHARACTERS
1 P	Pronotosternal suture without "mycangium"
1 A	Pronotosternal suture with "mycangium"
2 P	Axillary lines of mesocoxae medially not connected
2 A	Axillary lines of mesocoxae medially connected
3 P	Connection of mesocoxal axillary lines not incised
3 A	Connection of mesocoxal axillary lines incised
4 P	Axillary lines of mesocoxae strongly deviating backwards towards metepisterna
4 A	Axillary lines of mesocoxae simple, following posterior margin of mesocoxal cavities
5 P	Metasternal "axillary space" large and closed behind or nearly so
5 A	Metasternal "axillary space" very small or widely open behind
6 P	Basal portion of metacoxal axillary lines without furrows or cavities
6 A	Basal portion of metacoxal axillary lines with more or less deep furrows or cavities ("mycangia")
7 P	Elytra seriate-punctate
7 A	Elytra never seriate-punctate
8 P	Punctures of elytra without granulae
8 A	Punctures of elytra with granulae
9 P	Pronotum never hearth-shaped
9 A	Pronotum hearth-shaped
10 P	Prescutoscutellar suture distinct and complete
10 A	Prescutoscutellar suture obliterated
11 P	Pronotosternal suture without raised edges
11 A	Pronotosternal suture with raised edges
12 P	Tegmen simple or very shallowly emarginate at the apex
12 A	Tegmen strongly bilobate at the apex
13 P	Outer anterior angles of mentum projecting forwards
13 A	Outer anterior angles of mentum rounded or squared
14 P	Lateral sides of elytra simple
14 A	Lateral sides of elytra more or less crenulate
15 P	Scutellum large
15 A	Scutellum small, somewhat strongly reduced
16 P	Labrum with rounded lobes
16 A	Labrum with subtruncate lobes

Grouv. and *Megauchenia* McL., an assemblage that we believe is paraphyletic and is grouped partly upon plesiomorphies (i.e., angulate caudal marginal lines of metacoxal cavities) which are not informative about relationship. KIREJTSHUK (1988) noted that the genus *Temnoracta* Kir. resembles some of these genera, but does not belong to this group, and it is closely related to *Soronia* Er. We have examined the single type specimen of *Temnoracta accliva* Kirejtshuk, 1988 from Madagascar (MRAC) and agree with Kirejtshuk's conclusions. Therefore, we remove *Axyra*, *Pseudoplatychora* and *Megauchenia* from JELINEK'S (1982) grouping, placing them with *Taraphia* gen. n. and *Megaucheniodes* gen. n., based on the fore mentioned synapomorphies for the "Axyroid group".

In order to reconstruct the phylogeny of the "Axyroid group" we determined the polarity of characters with the primitive genus *Platychora*. Characters we have identified as informative are given in Table 1 and the data matrix provided in Table 2. We consider the condition of seriate punctate elytra (character 7) as primitive, occurring in many groups, although elytra with confused puncturation occurs in groups such as the Kateretidae, Smicripidae, Cybocephalidae and the Calonecrinae (Nitidulidae). The tegmen strongly bilobed (character 12) is a feature occurring in the Carpophilinae and in the Meligethinae, and may be primitive to the entire Nitidulidae. However, among the nitiduline lineage (Cryptarchinae, Nitidulinae and Cillaeinae) the tegmen may have been primitively fused and the bilobed condition is therefore independently derived in such taxa like *Camptodes*, *Hebascus*, and *Taraphia*.

One interesting character that has evolved in this group concerns the structures that we interpret as mycangia. Mycangia are specialized invaginations of the cuticle evolved for the transportation of spores in saprophagous and mycophagous beetles

TABLE 2

Character-state matrix of the genera in the "Axyroid-group" and in its out-group (*Platychora*).
0 = plesiomorphic state; 1 = apomorphic state.

CHARACTERS	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
GENERA																
<i>(Platychora)</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Megauchenia</i>	1	0	0	0	0	1	0	0	0	1	0	1	0	0	0	0
<i>Axyra</i>	1	0	1	0	0	1	1	1	0	0	0	0	0	0	0	0
<i>Megaucheniodes</i>	1	1	1	0	1	1	1	1	0	1	0	0	1	0	0	1
<i>Pseudoplatychora</i>	1	1	1	0	1	1	1	1	0	1	1	0	1	1	1	0
<i>Taraphia</i>	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0

(CROWSON, 1981, 1984; LAWRENCE, 1989). In the Nitidulinae these features apparently have evolved from enlarged punctures similar to those found on the sternum of *Pseudoplatychora*; very similar and apparently homologous metasternal structures are known to occur in other groups of Clavicornia, as Endomychidae (e.g. *Dapsa* Latreille) and related families. An intermediate condition occurs in some specimens of *Taraphia amplicollis* sp. n., while those in *T. gemina* sp. n. are larger and more distinct.

The most parsimonious cladogram so obtained (fig. 28) suggests that *Megaucheniodes* gen. n. is probably the sister-group of the clade (*Pseudoplatychora* + *Taraphia*), and that the genus *Axyra* is the sister-group of this group of genera.

ACKNOWLEDGMENTS

We are indebted to C. Besuchet and I. Löbl (MHNG), J. Decelle (MRAC) and N. Berti (MHNP), who allowed us to study material preserved in their institutions, and to R. Leschen (University of Kansas) for his helpful comments on the manuscript.

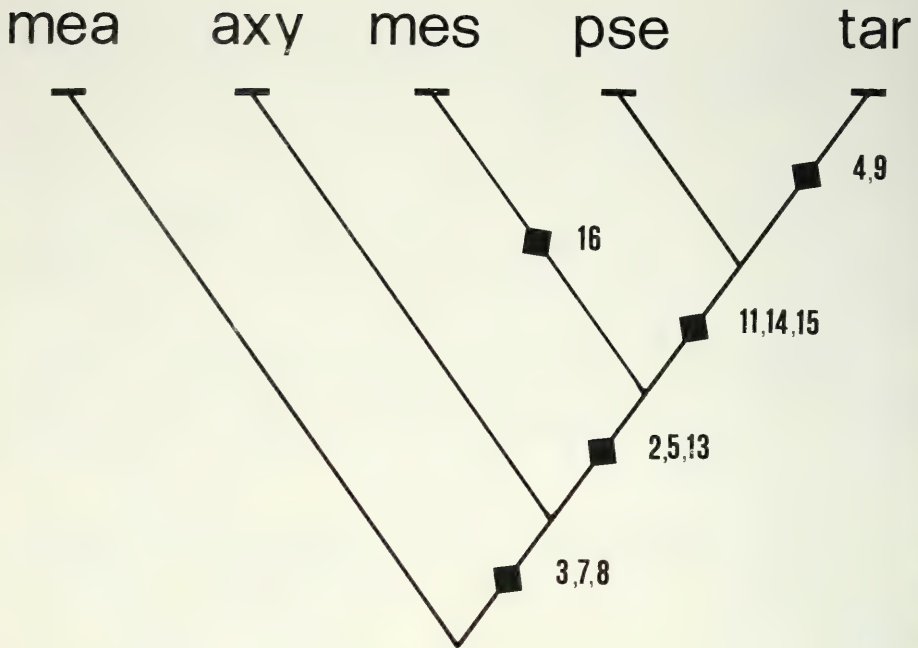


FIG. 28

Cladogram of the "Axyroid-group" of genera; numbers refer to characters in table 1. MEA = *Megauchenia*; AXY = *Axyra*; MES = *Megaucheniodes*; PSE = *Pseudoplatychora*; TAR = *Taraphia*.

LITERATURE

- CROWSON R.A., 1981. The biology of the Coleoptera. *Academic Press, New York & London*, 802 pp.
- 1984. The Associations of Coleoptera with Ascomycetes. In: Wheeler Q. & Blackwell M. (eds.): *Fungus-Insect relationships, perspectives in Ecology and Evolution. Columbia Univ. Press, New York*, 1984: 256–285.
- ERICHSON W.F., 1843. Versuch einer systematischen Eintheilung der Nitidularien. *German Z. Entomol.*, 4: 225–361.
- GILLOGLY L.R., 1965. A key to the Genera of the Subfamily Nitidulinae and description of a New Genus and a New Species. *Occas. Papers of the State Bureau of Ent. California*, 8 (1965): 1–24.
- GROUVELLE A., 1890. Description d'un Nitidulide nouveau de Sumatra. *Notes Leyden Mus.*, 12: 15–16.
- JELINEK J., 1982. New and little known taxa of Nitidulidae (Coleoptera). *Acta Mus. Nat. Pragae*, 38, B (3): 171–200.
- KIREJTSHUK A.G., 1988. New taxa of the Nitidulidae (Coleoptera) of the East Hemisphere. Part 2. *Trud. Zool. Inst. A.N. SSSR, Leningrad*, 178: 62–97.

- 1990. New species and notes on the taxonomy of the Nitidulid-beetles (Coleoptera, Nitidulidae) from Indochina and adjacent territories. Part 1. (In russian). *Trud. Zool. Inst. A.N. SSSR, Leningrad*, 209: 61-98.
- LAWRENCE, J., 1989. Mycophagy in the Coleoptera: feeding strategies and morphological adaptations. *In*: Wilding N., Collins N.M., Hammond P.M. & Webber J.F. (eds.): *Insect-Fungus interactions. Academic Press, London*, 1989: 1–23.
- MACLEAY W.A., 1825. *Annulosa javanica* or an attempt to illustrate the natural affinities and analogies of the insects collected in Java by T. Horsfield. *London*, 50 pp., 1 pl.